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Snacking: Indulgent or Essential to a Healthy Diet?

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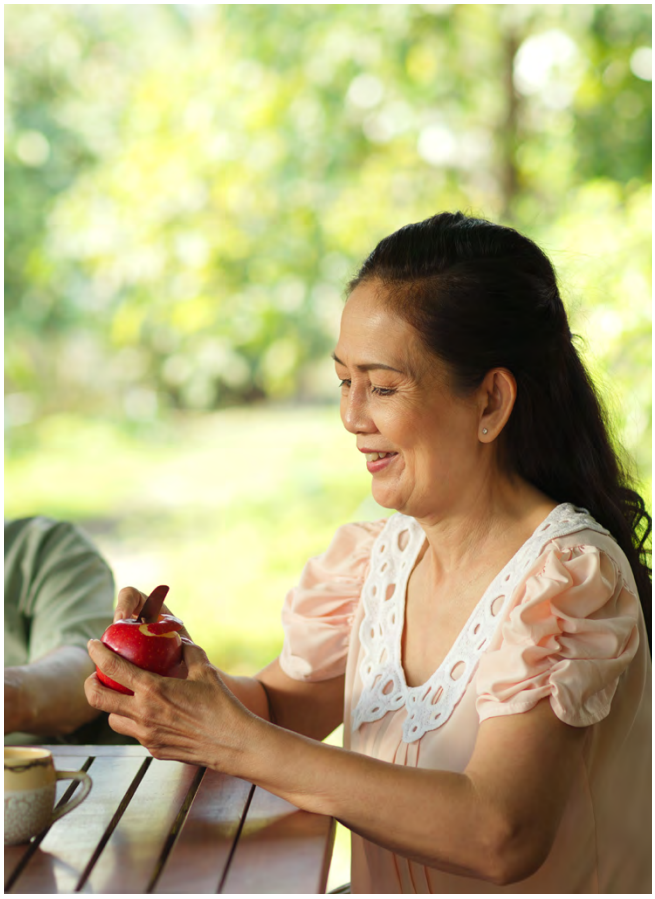
The European Food Information Council (EUFIC) notes that "snack" can denote the process of eating between meals or it can refer to foods that belong to a specific food group, have a particular nutrition profile, and/or are eaten at a particular time of day. According to EUFIC, snacks are considered to be informal and casual, and are eaten when a meal should not or cannot take place. The Dietary Guidelines for Americans present daily food plans that include a small between-meal eating occasion called a snack and comprised of a combination of food groups. The lines blur when snack refers to packaged snack foods, which tend to be high in fat, salt, and/or sugar and low in key nutrients. It can be difficult to separate the effects of the eating occasion from the foods selected. Among the challenges in examining the relationship between snacking and health is the lack of consensus on a definition of snack.



Prevalence and Growth

Snacking is highly prevalent around the world. Four in five Americans snack at least once a day and approximately half consume a snack twice or more daily. Kant and Graubard examined 40-year snacking trends and noted snacking and snacking frequency increased among women, who also became less likely to eat three daily meals. The first nationwide diet survey in Brazil, conducted in 2008 and 2009 on 34,000 individuals 10 years of age and older, revealed that 74% of Brazilians snack and 23% eat at least three snacks per day. In South Korea, the most common eating pattern includes three meals plus one or two snacks, with a trend toward increased snacking.

Snacking and Calories

Snacking can help individuals meet their daily calorie requirement, or it can contribute to excess. The additional calories provided in snacks offers a benefit to young children and those adults, including older adults, who may not be able to meet their caloric needs in three meals alone. For those with adequate calorie intake, however, snacking can be a source of excess, low-nutrient-dense calories.

Snacking can also contribute to a substantial proportion of calories. Data from the 2009-2010 NHANES (National Health and Nutrition Examination Survey) report show men and women deriving nearly one-quarter of their daily calories from snacks. Children in the U.S. are frequent snackers, with many eating three or more snacks per day. Each additional snack is associated with a 9.4% increase in energy intake, meaning snacks contribute a large portion of daily energy intake in school-age children. A representative sample of 5,031 children from the 2012 ENSANUT (Encuesta Nacional de Salud y Nutrición) (Mexico) showed that snacks contribute to approximately 17% of calories in the Mexican diet. Typical snacks in Mexico include fruit, salty snacks, candy, sweetened breads, cookies, and, for older children, sweetened soft drinks. In Brazil, snacking accounts for 21% of daily energy intake, but over 35% among those eating three or more daily snacks. Sweetened hot and cold beverages, sweets and desserts, fruit, and savory fried pastries are popular snack foods. It has been estimated that sweets, cookies, and sugar-sweetened beverages (SSBs) may increase energy intake among Brazilians by close to 20%. In Norway, snacking accounts for 17% and 21% of the energy intake of men and women, respectively.

Further, the types of foods and beverages served as snacks can influence calorie intake. A study of 26 preschoolers demonstrated that average snack calories significantly increased from 104.8 kcal to 175.4 kcal when children were served juice rather than water. Wansink et al. showed that school age children who were allowed to freely consume a snack consisting of cheese and vegetables ate 72% fewer calories, and felt fuller, than children allowed to freely consume potato chips. A review by Story and Larson on the effects of snacking on body weight reports significant increases in energy-dense, nutrient-poor foods as contributors to calories from snacking.

The Relationship Between Snacking and Body Weight

Agreement has not been reached regarding the role of snacking in management of body weight, nor for the optimal number of meals and snacks for individuals on weight loss regimens.

EUFIC acknowledges inconsistencies regarding the connection between snack consumption and the prevalence of overweight, and concludes that snacking itself does not cause overweight.

Evidence shows that the link between snacking and body weight depends on the type of snacks selected.

In Argentina, snacks were found to be an obesity risk factor, along with a high intake of sodium, refined grains, and starchy vegetables. A British study of more than 10,000 adults associated increased snack frequency with lower total body fat among normal weight individuals, but with higher waist circumference and subcutaneous fat among the overweight/obese.

Food choices may help define the snack-body weight relationship in adults. Kong et al note that while snacks could be a source of healthful nutrients and foods such as fiber, fruits and vegetables, they may also be associated with unhealthy eating habits that do not benefit body weight. In a study of snacking, diet quality, and body weight in 233 working adults, total snack calories did not affect body weight, but the percentage of calories from vegetables was significantly associated with lower BMI. Additionally, the percentage of calories from fruit/fruit juice and nuts improved diet quality while the percentage of calories from desserts, sweets, and SSBs had the opposite effect.

Observations in and recommendations for children vary. A Portuguese study of 589 young children found no association between consumption of salty snacks, soft drinks, cakes, and sweets and BMI at 2 years of age and two years later. Filipino researchers observed an association between childhood obesity and number of snack servings, snack calories, and low-quality snacks. Observations in Italian adolescents demonstrate a similar positive relationship between overweight/obesity and snack calories and frequency. Conversely, increased snack frequency and calories have been associated with reduced risk of overweight/obesity in the U.S. In China, a snack-dominant diet had no relationship to risk of overweight/obesity. Again, the defining line might be drawn between snacks as an additional meal and snacks comprised of “snack foods” and sweets.

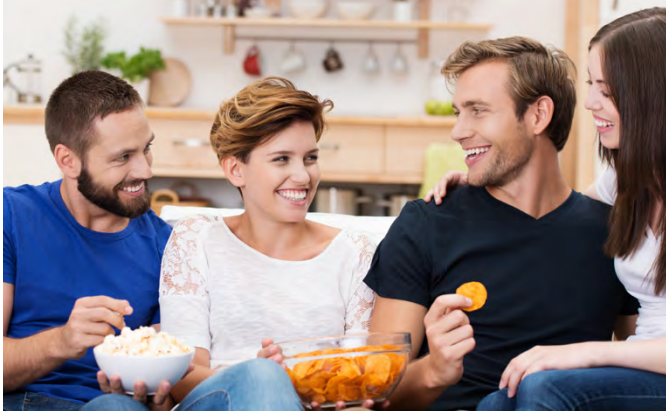
Snack Food Choices Impact Diet Quality

It has been suggested that replacing traditional snack foods with nutrient-dense choices such as fruits, vegetables, and low-sugar dairy foods could increase nutrient intake without negatively impacting calories, particularly when such behaviors are modeled for children by parents.

When the effects of snacking on total diet quality was assessed in children from low-income families using the Healthy Eating Index (HEI) 2005, which is a composite score measuring adherence to dietary recommendations in the U.S., snacking was associated with improved diet quality in elementary school-age children, although increased snacking frequency was associated with lower diet quality in adolescents. In older adults, increased snacking can boost nutrient intake and improve diet quality, with higher HEI-2005 scores and intake of fruits, whole grains, and milk. In a more recent study with HEI-2010 as the measurement tool, HEI increases when snacks include higher percentages of calories from juice, fruit, and nuts. Conversely, HEI has been inversely associated with snack calories from desserts, sweets, and SSBs. A British study that employed the Diet Quality Index for Adolescents (DQI-A) demonstrated that DQI-A increases with the number of snacks as long as some of the snacks are low in calories (up to 50 kcal/210 kJ). These findings demonstrate that snacks, when composed of low-calorie, nutrient-dense foods, can improve measures of diet quality in many age groups.

The Relationship Between Snack Food Choices and Appetite

The purpose of snacking should be to help meet the total daily calories and nutrients requirements, as well as satisfy hunger between meals, but whether it satiates could depend on food choices. Snacks that are highly palatable can lead to a greater intake of food and calories. In contrast, some foods may be more satiating. One study demonstrated that individuals who eat particular foods for snack, for example, almonds or high protein yogurt, may partially compensate for snack calories by eating less at subsequent meals. A yogurt snack also has been shown to delay the timing of the meal following the snack when study subjects were instructed to request a meal when hungry. Compared to milk and cheese, yogurt appears to have a greater effect on appetite suppression. Results, however, are inconsistent.



Snacking May Impact Health

Most studies to date that look at the relationship between diet and health have not separated snacking from other healthful or unhealthful diet characteristics. This makes it difficult to attach blame to snacking and specific types of snack foods. In one study, snacking in general and snacking on "unhealthy" foods in particular were linked to increased risk of metabolic syndrome. In Australia, a combination of high television viewing time and high snack food consumption was positively associated with incidence of metabolic syndrome. Certain snack foods may positively affect risk factors for metabolic syndrome, namely, glucose and insulin responses. In one study, a higher protein, higher fiber snack bar was associated with lower glucose and insulin responses and reduced calorie intake at the following meal, as compared to a high fat, high sugar bar.

Snack food choices may also impact sodium consumption. In the U.S., 16% of dietary sodium in school age children is contributed by snacks. An Italian study of 1,200 adolescents with mean sodium intake from salty snacks at 1.4 g/day observed significantly increased blood pressure with higher sodium intake from snacks and more frequent inclusion of salty snacks.

Dietary Guidance Incorporates Snacking

International dietary guidelines incorporate snacking into meal patterns, particularly at higher calorie levels. The ChooseMyPlate meal companion suggests two daily snacks at the standard 2,000-calorie level, with snacks consisting of a combination of up to four food groups. The Scientific Report of the 2015 Dietary Guidelines Advisory Committee calls for promoting "healthy" and "smart" snacks to reduce consumption of sugar, saturated fat, sodium, and calories. The World Health Organization includes in its definition of a healthy diet eating fresh fruits and raw vegetables as snacks and in place of sugary snacks, limiting the consumption of foods and drinks containing high amounts of sugars (e.g. SSBs, sugary snacks and candies), and limiting the consumption of salty snacks. Health Canada advises snacking on nutritious foods that meet recommended Food Guide Servings and are not high in calories, fat, sugar or salt. Finnish Nutrition Recommendations 2014 call for eating four to six times daily.

Dietary guidance for people with diabetes addresses snacking as a tool for aiding blood glucose management. The American Diabetes Association (ADA) acknowledges both the ability of snacking to add nutrition and curb hunger and the typical association of snacking with foods high in sugar and/or added fats. Among ADA's recommendations on snacking are to fit in another serving of whole grains, fruits or vegetables; control snack portions; plan ahead to eat a healthy snack; avoid mindless eating while watching television, using the computer, reading, or driving; and stocking up on healthy snacks to have on hand. The International Diabetes Federation does not include guidelines on snacking, instead calling for health professionals to individualize advice on food/meals to match needs, preferences, and culture, advise on reducing energy intake and control of foods with high amounts of added sugars, fats or alcohol, and match the timing of medication (including insulin) and meals.

Future Direction

While research findings suggest a positive relationship between healthy snacking and nutrition, body weight, and health, additional studies are needed to elucidate the potential benefits of specific foods and food groups, as well as snack foods containing functional components and ingredients such as proteins, fibers, prebiotics, and probiotics.

Research findings suggest that snacking can improve diet quality when the right foods are selected. Together with the increase in snack frequencies across the globe, this provides a great opportunity for the food industry to redefine the snack category from unhealthy indulgence to foods that can help consumers meet their nutrient needs.

From a consumer demand perspective, nutrition has surpassed convenience and is gaining pace on price as the second most important driver for food purchase decisions. Specifically, consumers are seeking foods that are:

1. Free from ingredients like artificial flavors, colors, and preservatives
2. Low in calories, salt, or sugar
3. High in beneficial nutrients such as fiber, protein, and whole-grains

At the same time, however, taste is still the #1 driver in food decisions and consumers expect snack foods to deliver on taste. To address this challenge, the food industry has taken steps such as portfolio-wide reductions in salt and sugar, reformulating products to be free from ingredients consumers want less of, and incorporating functional ingredients, such as fiber, protein, and probiotics, into foods to improve their healthfulness.

Information Resources, Inc. (IRI) in its assessment of the snack food industry, notes that consumers today seek out smaller mini-meals that they purchase from a wider variety of outlets, including "healthy" vending machines. They are driving higher sales of savory items such as sushi, meat snacks like jerky, and hand-held wrap sandwiches, although nuts and snack bars continue to be popular. With indulgence becoming healthier and health becoming more indulgent, IRI sees a need for satisfying snack foods with natural ingredients, fiber, "energy," and other desired features. As the industry moves forward, it will be important to keep in mind the shift in consumer behavior toward increased snacking frequency in place of structured meals, as well as the impact that snack choice can have on overall consumer health.

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